Express Mail Label No. EL912298983US

FORM PTO-1390 (Modified) (REV 11-2000) U.S. DEPART[illegible]F COMMERCE PATENT AND TRADEMARK OFFICE	ATT[illegible]Y'S DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371	**CAF-28502/03**
	U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.5) 09/889834

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/GB00/00176	**24 JANUARY 2000 (24.01.00)**	**23 JANUARY 1999 (23.01.99)**

TITLE OF INVENTION
CARGO HANDLING APPARATUS

JC03 Rec'd PCT/PTO 23 JUL 2001

APPLICANT(S) FOR DO/EO/US
ROSS, Ralph, Barclay; CRABTREE, Michael, Wayne

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include itens (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☐ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☐ Certificate of Mailing by Express Mail
23. ☐ Other items or information:

EL912298983US

25006
PATENT TRADEMARK OFFICE

PCTUS1/REV03

JC17 Rec'd PCT/PTO 23 JUL 2001

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/88985	PCT/GB00/00176	CAF-28502/03

24. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :		CALCULATIONS PTO USE ONLY	
☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO	$1000.00		
☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO	$860.00		
☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO	$710.00		
☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4)	$690.00		
☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4)	$100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =		$860.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).		$0.00	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	29 - 20 =	9	x $18.00	$162.00	
Independent claims	2 - 3 =	0	x $80.00	$0.00	
Multiple Dependent Claims **(check if applicable)**.			☐	$0.00	
TOTAL OF ABOVE CALCULATIONS =				$1,022.00	
☒ Applicant claims small entity status. (See 37 CFR 1.27). The fees indicated above are reduced by 1/2.				$511.00	
SUBTOTAL =				$511.00	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +				$0.00	
TOTAL NATIONAL FEE =				$511.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).** ☐				$0.00	
TOTAL FEES ENCLOSED =				$511.00	
				Amount to be: refunded	$
				charged	$

a. ☒ A check in the amount of **$511.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **07-1180** A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Judith M. Riley
Gifford, Krass, Groh, Sprinkle,
Anderson & Citkowski, P.C.
280 N. Old Woodward Avenue, Suite 400
Birmingham, MI 48009-5394
(248) 647-6000

SIGNATURE

Douglas W. Sprinkle
NAME

27,394
REGISTRATION NUMBER

July 23, 2001
DATE

TRANSMITTAL LETTER (General - Patent Pending) 340	Docket No. CAF-28502/03

In Re Application Of: **Ralph Barclay Ross et al.**

Serial No.	Filing Date	Examiner	Group Art Unit
09/889,834	November 28, 2001		3652

Title: **CARGO HANDLING APPARATUS**

TO THE COMMISSIONER OF PATENTS AND TRADEMARKS:

Transmitted herewith is:

Renewed Petition Under 37 CFR 1.47 (a)
Exhibit A: Letter to Wayne S. Breyer dated October 17, 2001
Exhibit B: Letter to Andrew Shanks date October 18, 2001
Exhibit C: Letter to Wayne S. Breyer dated February 21, 2002 via Cetified Mail & Signed Certified Mail Receipt
Exhibit D: Declaration of Mark D. Schneider ---- Exhibit E: Copies of Signed Declaration & Power of Attorney

in the above identified application.

- ☒ No additional fee is required.
- ☐ A check in the amount of is attached.
- ☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. **07-1180** as described below. A duplicate copy of this sheet is enclosed.
  - ☐ Charge the amount of
  - ☐ Credit any overpayment.
  - ☒ Charge any additional fee required.

Signature

Dated: **October 11, 2002**

Mark D. Schneider, Reg. No. 43,906
Gifford, Krass, Groh, Sprinkle, Anderson & Citkowski, P.C.
280 North Old Woodward - Suite 400
Birmingham, MI 48009
(248) 647-6000

exp.

I certify that this document and fee is being deposited on **10-11-2002** with the U.S. Postal Service as ~~first class~~ mail under 37 C.F.R. 1.8 and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231. Label # EV 205793917 US

Signature of Person Mailing Correspondence

Judith T. Lange

Typed or Printed Name of Person Mailing Correspondence

cc:

Attorney Docket No. CAF-28502/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Ralph Barclay Ross et al.

Serial No.:

Filed: 23 July 2001

For: CARGO HANDLING APPARATUS

PRELIMINARY AMENDMENT

Box PCT
Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Prior to the examination of the above-referenced patent application, please amend the above-referenced application in the following manner:

IN THE CLAIMS:

Please amend claim 3 as follows:

3. (Amended) The apparatus of claim 1, wherein at least two packing members are provided.

Please amend claim 5 as follows:

5. (Amended) The apparatus of claim 1, wherein the deformable portion of the packing member is resilient.

Please amend claim 6 as follows:

6. (Amended) The apparatus of claim 1, wherein the frame is generally U-shaped.

Please amend claim 7 as follows:

7. (Amended) The apparatus of claim 1, wherein two frames are provided, one for location towards each end of the elongate members.

Please amend claim 10 as follows:

10. (Amended) The apparatus of claim 8, wherein the connecting member between the two end frames has forklift protector plates to facilitate handling of the apparatus.

Please amend claim 11 as follows:

11. (Amended) The apparatus of claim 1, wherein the packing member is adapted to be positioned at different heights within the frame.

Please amend claim 12 as follows:

12. (Amended) The apparatus of claim 1, wherein the packing member is restrained against movement parallel and perpendicular to the length of the constrained elongate members.

Please amend claim 16 as follows:

16. (Amended) The apparatus of claim 1, wherein the retaining means is adapted to pull an upper packing member towards the base.

Please amend claim 18 as follows:

18. (Amended) The apparatus of claim 1, wherein the retaining means comprises flexible members adapted to be draped over an uppermost packing member.

Please amend claim 19 as follows:

19. (Amended) The apparatus of claim 1, wherein the packing member comprises a rigid section.

Please amend claim 21 as follows:

21. (Amended) The apparatus of claim 19, wherein one or more deformable elements is fixed to the rigid section.

Please amend claim 26 as follows:

26. (Amended) The apparatus of claim 22, wherein the elastomer jacket defines angular edges that are adapted to exert increasing compressive resistance to elongate member lateral motion with increasing applied vertical force.

Please amend claim 29 as follows:

29. (Amended) The method of claim 27, wherein two frames are provided, one for location towards each end of the elongate members.

REMARKS

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with Markings to Show Changes Made."

If the Examiner has any questions relating to the application, Applicant's attorney may be reached at (248) 647-6000.

Respectfully submitted,

Douglas W. Sprinkle, Reg. No. 27,394
Judith M. Riley, Reg. No. 31,561
Attorney for Applicant
Gifford, Krass, Groh, Sprinkle,
Anderson & Citkowski, P.C.
280 N. Old Woodward Ave., Suite 400
Birmingham, MI 48009-5394
(248) 647-6000

Date: 7/23/01

JMR/gs
GS-C:\docs\JMR\CAF28502-pre.doc

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claim 3 has been amended as follows:

3. (Amended) The apparatus of claim 1 [or 2], wherein at least two packing members are provided.

Claim 5 has been amended as follows:

5. (Amended) The apparatus of claim 1 [any of the preceding claims], wherein the deformable portion of the packing member is resilient.

Claim 6 has been amended as follows:

6. (Amended) The apparatus of claim 1 [any of the preceding claims], wherein the frame is generally U-shaped.

Claim 7 has been amended as follows:

7. (Amended) The apparatus of claim 1 [any of the preceding claims], wherein two frames are provided, one for location towards each end of the elongate members.

Claim 10 has been amended as follows:

10. (Amended) The apparatus of claim 8 [or 9], wherein the connecting member between the two end frames has forklift protector plates to facilitate handling of the apparatus.

Claim 11 has been amended as follows:

11. (Amended) The apparatus of claim 1 [any of the preceding claims], wherein the packing member is adapted to be positioned at different heights within the frame.

Claim 12 has been amended as follows:

12. (Amended) The apparatus of claim 1 [any of the preceding claims], wherein the packing member is restrained against movement parallel and perpendicular to the length of the constrained elongate members.

Claim 16 has been amended as follows:

16. (Amended) The apparatus of claim 1 [any of the preceding claims], wherein the retaining means is adapted to pull an upper packing member towards the base.

Claim 18 has been amended as follows:

18. (Amended) The apparatus of claim 1 [any of the preceding claims], wherein the retaining means comprises flexible members adapted to be draped over an uppermost packing member.

Claim 19 has been amended as follows:

19. (Amended) The apparatus of claim 1 [any of the preceding claims], wherein the packing member comprises a rigid section.

Claim 21 has been amended as follows:

21. (Amended) The apparatus of claim 19 [or 20], wherein one or more deformable elements is fixed to the rigid section.

Claim 26 has been amended as follows:

26. (Amended) The apparatus of claim 22 [any of claims 22 to 25], wherein the elastomer jacket defines angular edges that are adapted to exert increasing compressive resistance to elongate member lateral motion with increasing applied vertical force.

Claim 29 has been amended as follows:

29. (Amended) The method of claim 27 [or 28], wherein two frames are provided, one for location towards each end of the elongate members.

CARGO HANDLING APPARATUS

The present invention relates to cargo handling apparatus, particularly apparatus for packaging elongate members. The invention has particular application in handling lengths of drill pipe, and other downhole tubulars, such as casing and liner.

Drilling boreholes by rotary drilling usually involves use of a drillstring with a drillbit at the distal end, and a motor at the rig end. The drillstring is conventionally made up of many drillpipe sections which are connected together by threaded box and pin connections. The drillpipe sections are typically 9.5 - 13.1 metres (31 - 43') long, are relatively heavy, and require careful handling.

For storing and transporting drillpipe and other tubulars it is known to stack tubular lengths in cuboid bundles. The bundles are formed using perhaps four U-frames, with spacers being located between the arms of the U-frames and having upper and lower faces profiled to cooperate with tubular lengths of a particular diameter. The U-frames are spaced along the bundle and the bundle is lifted by slings or the like coupled to the U-frames. Accordingly, the spacers must be selected to suit the particular drillpipe dimensions, such that it is necessary for drillpipe suppliers and shippers to retain an extensive inventory of spacers.

It is among the objectives of embodiments of the present invention to obviate or mitigate this and other disadvantages of existing tubular handling systems.

According to the present invention there is provided apparatus for packaging elongate members, the apparatus comprising: a frame comprising a base and side members; at least one packing member engageable with the frame, the packing member having a deformable portion for engaging elongate members to be handled; and means for retaining the packing member in contact with the elongate members.

The invention also relates to a method of packaging elongate members.

The packing member is preferably in the form of a cross-member for extending between the frame side members.

Preferably more than one packing member is provided, and in preferred embodiments of the invention each elongate member (such as length of drillpipe or other tubular) is in contact with at least one packing member. It is preferred that a packing member overlies and underlies each elongate member such that, when the elongate members are secured within the apparatus, the force applied by the retaining means causes the upper and lower packing members to deform at respective upper and lower contact areas with the elongate member; the elongate members are thus gripped and retained by relatively large contact areas, produced by the deformation of the packing members.

Due to the deformability of the packing members the invention allows packaging of a range of elongate members

diameters or shapes. Members to be transported or stored may be placed in the frames with a packing member above and beneath each layer of members between the side members. In order to grip the elongate members effectively, each layer of members should be uniform in diameter or geometry and dimensions, but different layers may have different diameters or geometries and dimensions.

Preferably, the deformable portion of the packing member is resilient.

The frame may be generally U-shaped, and may be provided as a unitary part comprising the base and upright sides, or alternatively, the base may be provided as a part which is separable from the two side members.

Preferably, two frames are provided, one for location towards each end of the elongate members. However, in certain applications of the invention a single U-frame may be used for securing one or more elongate members.

Where two frames are provided, the frames are preferably, but not necessarily, joined by at least one connector member. Preferably two connector members are provided and with the base members of the frames create a generally rectangular base frame. The connecting members between the two end frames may optionally have forklift protector plates to facilitate handling of the apparatus.

The connector members limit the force that packing members within each frame must exert on constrained members to maintain relative distance between the two frames. During lifts, the connector members maintain the frames in

the same relative positions. The force necessary to maintain constrained member position is thereby limited to resisting rolling or sliding towards or perpendicular to the frames. The deformable portion of the packing member, which may be formed of an elastomer, may thus be adapted to accommodate a greater range of geometries and dimensions than practical when lifting forces directly affect the force applied between the packing members and constrained members.

The packing members may be positioned at any convenient height or spacing within the frames; the vertical position may vary depending upon the size of the elongate members beneath each packing member.

Each packing member is preferably restrained against movement parallel and perpendicular to constrained member length. This may be accomplished by means of channels on each side member which the packing members engage by means of rigid heads for location in the channels. The heads are preferably slidable in the channels. The side members thus restrict packing member motion perpendicular to constrained member length and the channels restrict packing member motion parallel to constrained member length. The channels also act to maintain packing member length, limiting cross-member bending under forces parallel to constrained member length. Of course other packing member restraining arrangements may be utilised, including providing channels or apertures in the packing member ends to cooperate with corresponding profiles or members on or associated with the

side members.

Preferably, the retaining means is adapted to pull upper packing members towards the base, thereby providing sufficient vertical force to maintain the elongate members between the packing members in compression. A threaded rod may be attached at the base of each frame, and a nut drawn down on the rod, above the top packing member. In other embodiments, clamping levers or hydraulic or pneumatic rams may be utilised. Alternatively flexible members, such as straps, slings or chains may be draped over the uppermost packing member, optionally adjacent each side member, and mechanically tightened, for example by ratchets.

The packing member preferably comprises a rigid section, typically a rigid centre section, which preferably provides resistance to motion in three axes: vertical, longitudinal and lateral. To this centre section is bonded or otherwise fixed one or more deformable elements, preferably an elastomeric jacket. The bonding is preferably by thermal bonding of extruded elastomer or moulded elastomer. The extrusion form or mould may shape the elastomer into vertical and lateral profiles across the jacket length. These profiles are preferably symmetrically opposing with respect to the elastomer lateral and vertical centrelines.

The elastomer jacket vertical profiles on either side of the centre section are optionally shaped to facilitate elastomer vertical and lateral displacement with increasing vertical compression. Under sufficient vertical

compression, inclined lobes of the top and bottom halves, preferably symmetrical with respect to the vertical centreline of the centre sections, may move together. Greater vertical force increases the displacement of the lobes towards each other.

The elastomer jacket preferably has side lobes and a central section, with one or more channels between the central section and the side lobes. The channels facilitate drainage of fluid from the jacket faces.

On the elastomer jacket top and bottom lateral profiles, vertical force exerted by the constrained elongate members deforms the elastomer, the degree of deformation increasing with increasing force. This deformation exerts pressure against the elongate member, where the elastomer is in contact with the member. The degree of pressure will vary with, for example, elastomer thickness above or below the lateral centreline, and with the magnitude of vertical force compressing the elastomer against the elongate member.

The elastomer jacket top and bottom lateral profiles in certain embodiments have angular edges that exert increasing compressive resistance to elongate member lateral motion with increasing applied vertical force. Opposing symmetry with respect to the lateral centreline achieves increasing compressive resistance to elongate member lateral motion in either direction. The elongate member is constrained by elastomer-enclosed or coated packing members above and below. If the friction co-

efficient between the elastomer and the elongate member surface is sufficient, increasing compression-resistance force is imparted to the constrained member surface, preventing motion along longitudinal and lateral axes. Elongate member accelerative force is typically transferred to the centre section. The elongate member, vertically constrained above and beneath between packing members, and by means of compression-resistance force prevented from motion in the two axes, is thereby maintained in position relative to the packing members.

Embodiments of the invention will now be described, by way of example only, and with reference to the accompanying drawings, in which:

Figure 1 is a side view of one end of apparatus according to a preferred embodiment of the invention;

Figure 2 is a plan view of the Figure 1 apparatus;

Figure 3 is an end view of the Figure 1 apparatus;

Figure 4(a) and (b) show end and side views of a top bar for the Figure 1 apparatus;

Figure 5 shows a schematic end view of a Figure 1 apparatus loaded with pipe;

Figure 6 is a detailed view of a corner portion of the Figure 2 drawing;

Figure 7 is a perspective view of an alternative embodiment of a top member;

Figure 8 is a perspective view of an elastomeric-jacketed crossbar;

Figure 9 is a section of view on line 9 - 9 of Figure

8; and

Figure 10 is an end profile of the Figure 8 crossbar.

Referring now to the drawings, apparatus for packaging and carrying drill pipes and other tubulars comprises a generally U-shaped frame (Figure 3) comprising a horizontal base member 6 attached to upright side members 2 having C-shaped channels 5 secured to their inner faces and oriented towards one another. Two frames are connected by members 1 (only one frame shown in Figures 1 and 2). The connector members 1 include forklift toe protectors 4 to enable the apparatus to be lifted more easily by forklift trucks. The connector members 1 are bolted at 35 to flanges 7 on the uprights 2, but may alternatively be connected by welding, or by fabricating as a single part, or by any other means suitable. At the base of each upright 2, a socket 3 is provided for locating a stacking lug 11 of a lower frame to allow stacking of loaded frames on top of one another.

The channels 5 are adapted to receive the head 23h of a crossbar 23 (Figures 8 & 9). The crossbar 23 is formed from steel and has a surrounding jacket 22 of elastomeric polyurethane or similar material, to create a deformable packing member. The heads 23h of the crossbars 23 are vertically movable in the channels 5 so that once the heads 23h have been located in respective channels 5, the crossbars 23 are free to move vertically (but in no other direction) in the frame.

The profile of the elastomeric jacket may take a variety of forms, although the jacket 22 as illustrated in

Figure 10 features the preferred profile. The jacket 22 has radiussed sides, and at least one channel 22c formed in its upper and lower surfaces. Each of the upper and lower surfaces of the jacket 22 has a pair of opposing lobes 221 upon which are provided grooves 22g, and a central ridge 22r is located between the two lobes 221, which ridge 22r is indented so as to present a concave surface. The jacket 22 may be moulded around the bar 23, but may also be extruded or formed thereon by any other means suitable.

In use, drillpipe lengths 40 are loaded onto the frames so that they lie on a crossbar 23 compressing and deforming the elastomeric jacket 22 at areas of contact. A layer of pipe lengths is laid across the lowermost crossbar 23a (Figure 5), and a further crossbar 23b is then located, by its heads 23h, in the side channels 5 and slid down to rest on top of the layer of drillpipe lengths 40. A further layer of drillpipe lengths is then loaded onto the uppermost crossbar 23b and the process is continued until the desired number of pipes has been loaded or until the uppermost layer of pipes is approaching the upper ends of the channels 5; the uppermost member 23f can slide in the channels 5 and so the apparatus may only be partially loaded, if desired. A final crossbar 23f is then laid on top of the uppermost layer of drillpipe sections 40, and a top member or tie down bar 10 (Figure 4) is then placed on top of the uppermost crossbar 23f.

The top member 10 locates into the side channels 5 in the same manner as the crossbars 23, and has curved

channels 28 in its upper surface 29. A chain 19 (Figure 1) fastened to a lug 32 at the base of each upright 2 is passed from the lug 32 over the top member 10, located in the channel 28 and over the arrangement of pipe lengths 40 and crossbars 23, to the opposite side of the upright 2, where it is connected to a ratchet tensioning mechanism 17 secured to a further lug 32' attached to the flange 7 or to a connector member 1 (or to any convenient point). The ratchet mechanism 17 is then tightened to exert a force on the top member 10 to further press the layers of pipe lengths 40 against the elastomeric jackets 22 on the crossbars 23. The resulting compression of the elastomeric jackets 22 indents the upper and lower surfaces of the jackets. The compression also causes the lobes 221 to move together toward the central ridge 22r, and any excessive force applied merely compresses the jacket 22 further. The grooves 22g and sides of the lobes 221 present angular faces to the pipe section 40, and restrict axial sliding movement of the pipe 40. If desired, the upper surfaces of the lobes 221 and ridge 22r may be faced with a high friction material so as to further reduce the possibility of slippage.

When the desired tension is reached on the ratchet device 17, the ratchet operating pin is tied off at 18 to prevent accidental release of tension, and then the packaged pipe and the frame can safely be transported, and stacked if necessary. A U-shaped frame is provided at each end of the connecting members 1 in the embodiment shown and

the operation for loading and securing the pipe sections 40 is the same for each U-shaped frame.

It will be noted from Figure 5 that the apparatus may accommodate pipe lengths of different diameters; the elastomeric jackets 22 simply deform to accommodate the different pipe forms, such that tubular producers, suppliers and shippers are not required to retain an inventory of different crossbars to accommodate different diameter tubular lengths. Further, the ability to accommodate different diameters in a single package allows for more efficient storage and transport of small batches of tubular lengths.

It will be recognised by those of skill in the art that the abovedescribed embodiments are merely exemplary of the present invention and that various modifications and improvements may be made thereto without departing from the scope of the present invention.

CLAIMS

1. Apparatus for packaging elongate members, the apparatus comprising: a frame comprising a base and side members; at least one packing member engageable with the frame, the packing member having a deformable portion for engaging elongate members to be handled; and means for retaining the packing member in contact with the elongate members.

2. The apparatus of claim 1, wherein the packing member comprises a cross-member for extending between the frame side members.

3. The apparatus of claim 1 or 2, wherein at least two packing members are provided.

4. The apparatus of claim 3, wherein, in use, a packing member overlies and underlies each elongate member.

5. The apparatus of any of the preceding claims, wherein the deformable portion of the packing member is resilient.

6. The apparatus of any of the preceding claims, wherein the frame is generally U-shaped.

7. The apparatus of any of the preceding claims, wherein

two frames are provided, one for location towards each end of the elongate members.

8. The apparatus of claim 7, wherein the frames are joined by at least one rigid connector member.

9. The apparatus of claim 8, wherein two connector members are provided and with the base members of the frames create a generally rectangular base frame.

10. The apparatus of claim 8 or 9, wherein the connecting member between the two end frames has forklift protector plates to facilitate handling of the apparatus.

11. The apparatus of any of the preceding claims, wherein the packing member is adapted to be positioned at different heights within the frame.

12. The apparatus of any of the preceding claims, wherein the packing member is restrained against movement parallel and perpendicular to the length of the constrained elongate members.

13. The apparatus of claim 12, wherein the packing member ends engage profiles on the side members.

14. The apparatus of claim 13, wherein the packing member ends define rigid heads for location in channels defined by

the side members.

15. The apparatus of claim 14, wherein the heads are slidable in the channels.

16. The apparatus of any of the preceding claims, wherein the retaining means is adapted to pull an upper packing member towards the base.

17. The apparatus of claim 16, wherein the retaining means comprises a mechanical tightening arrangement.

18. The apparatus of any of the preceding claims, wherein the retaining means comprises flexible members adapted to be draped over an uppermost packing member.

19. The apparatus of any of the preceding claims, wherein the packing member comprises a rigid section.

20. The apparatus of claim 19, wherein the packing member comprises a rigid centre section.

21. The apparatus of claim 19 or 20, wherein one or more deformable elements is fixed to the rigid section.

22. The apparatus of claim 21, wherein the deformable element is in the form of an elastomeric jacket.

23. The apparatus of claim 22, wherein the elastomer jacket defines vertical profiles on either side of the rigid section shaped to facilitate elastomer displacement with increasing vertical compression.

24. The apparatus of claim 23, wherein the elastomer jacket defines displaceable lobes, upper and lower lobes on each side of the jacket being relatively vertically movable.

25. The apparatus of claim 24, wherein the elastomer jacket defines side lobes and a central section, with one or more channels between the central section and the side lobes.

26. The apparatus of any of claims 22 to 25, wherein the elastomer jacket defines angular edges that are adapted to exert increasing compressive resistance to elongate member lateral motion with increasing applied vertical force.

27. A method of packaging elongate members, the method comprising:

providing a frame comprising a base and side members;

providing at least one packing member having a deformable portion;

locating the packing member in the frame;

locating elongate members in the frame; and

securing the packing member with the deformable

portion in contact with the elongate members.

28. The method of claim 27, further comprising providing more than one packing member and locating the packing members and elongate members in the frame such that a packing member overlies and underlies each elongate member.

29. The method of claim 27 or 28, wherein two frames are provided, one for location towards each end of the elongate members.

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 :
B65G 1/04, B65D 81/05

A1

(11) International Publication Number: WO 00/43295

(43) International Publication Date: 27 July 2000 (27.07.00)

(21) International Application Number: PCT/GB00/00176

(22) International Filing Date: 24 January 2000 (24.01.00)

(30) Priority Data:
9901474.8 23 January 1999 (23.01.99) GB

(71)(72) Applicants and Inventors: ROSS, Ralph, Barclay [GB/GB]; Corsehill Cottage, Parkhill, Dyce, Aberdeen AB21 0HB (GB). CRABTREE, Michael, Wayne [GB/GB]; 2 Pinecrest Gardens, Bieldside, Aberdeen AB15 9FL (GB).

(74) Agents: McCALLUM, William, Potter et al.; Cruikshank & Fairweather, 19 Royal Exchange Square, Glasgow G1 3AE (GB).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published

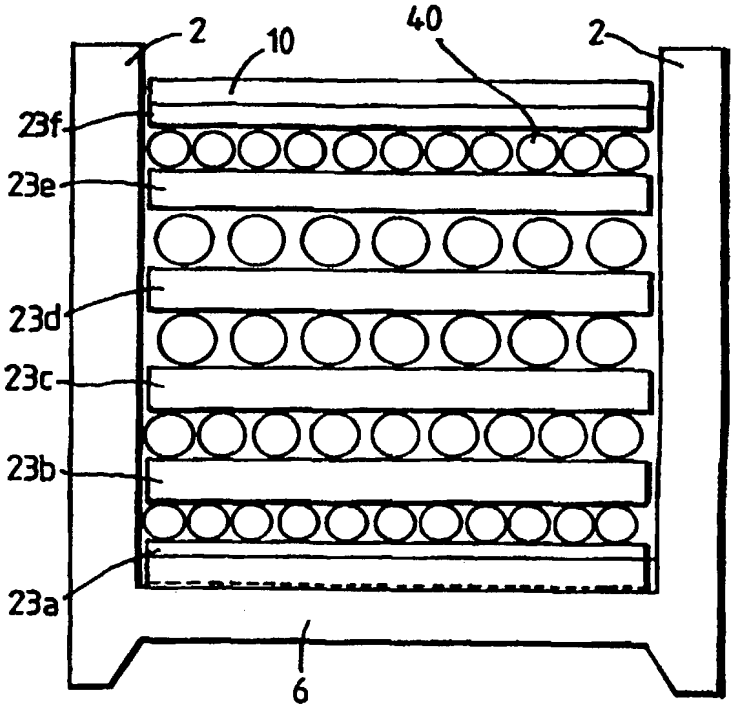
With international search report.

Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: CARGO HANDLING APPARATUS

(57) Abstract

Apparatus for packaging elongate members, such as drillpipe (40) and downhole tubulars, comprises a frame comprising a base (6) and side members (2), and packing members (23) for engaging with the side members (2). The packing members (23) have a deformable portion (22) for engaging elongate members to be handled. Tie down chains (19) or other retainers hold the packing members (23) in contact with the elongate members (40).



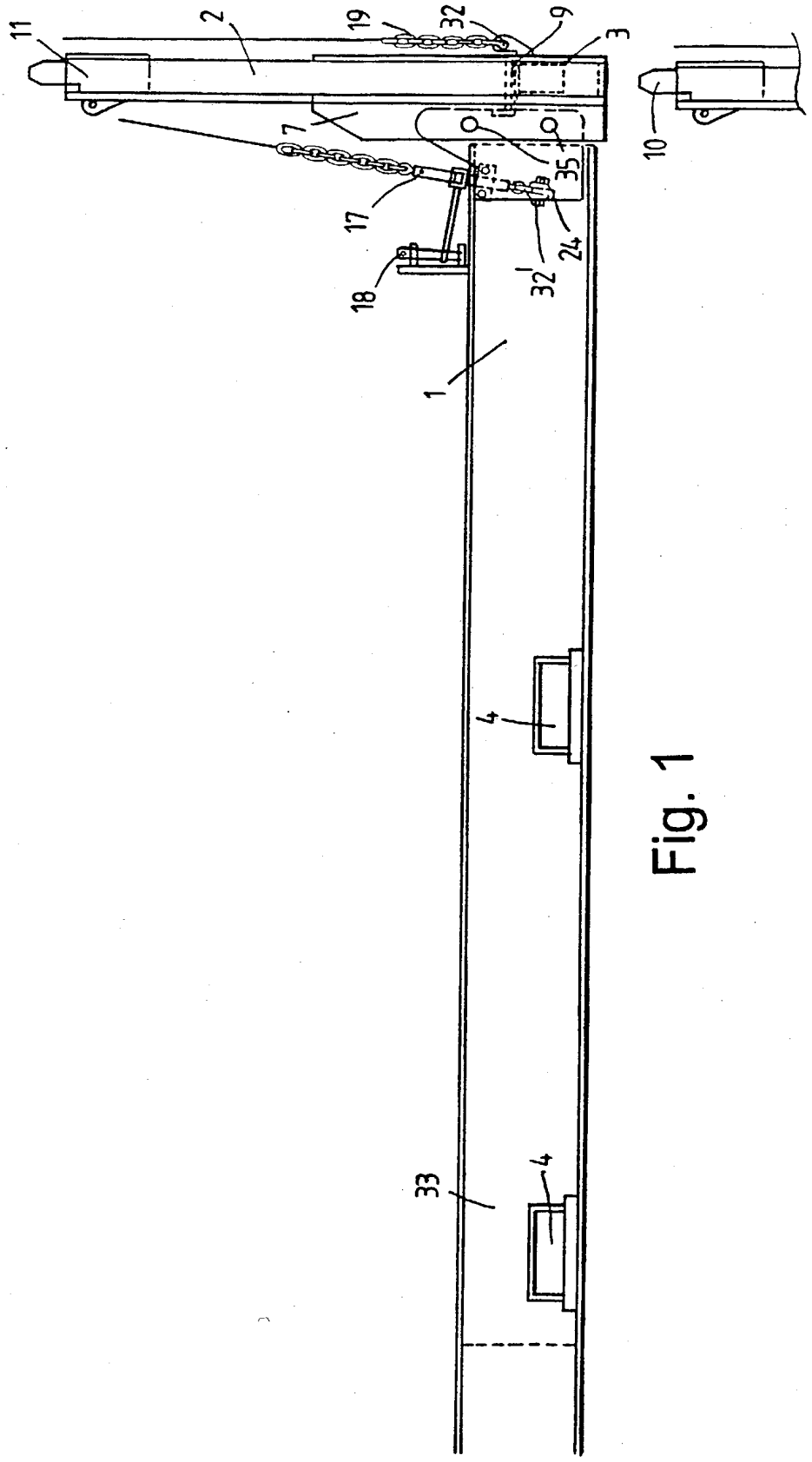


Fig. 1

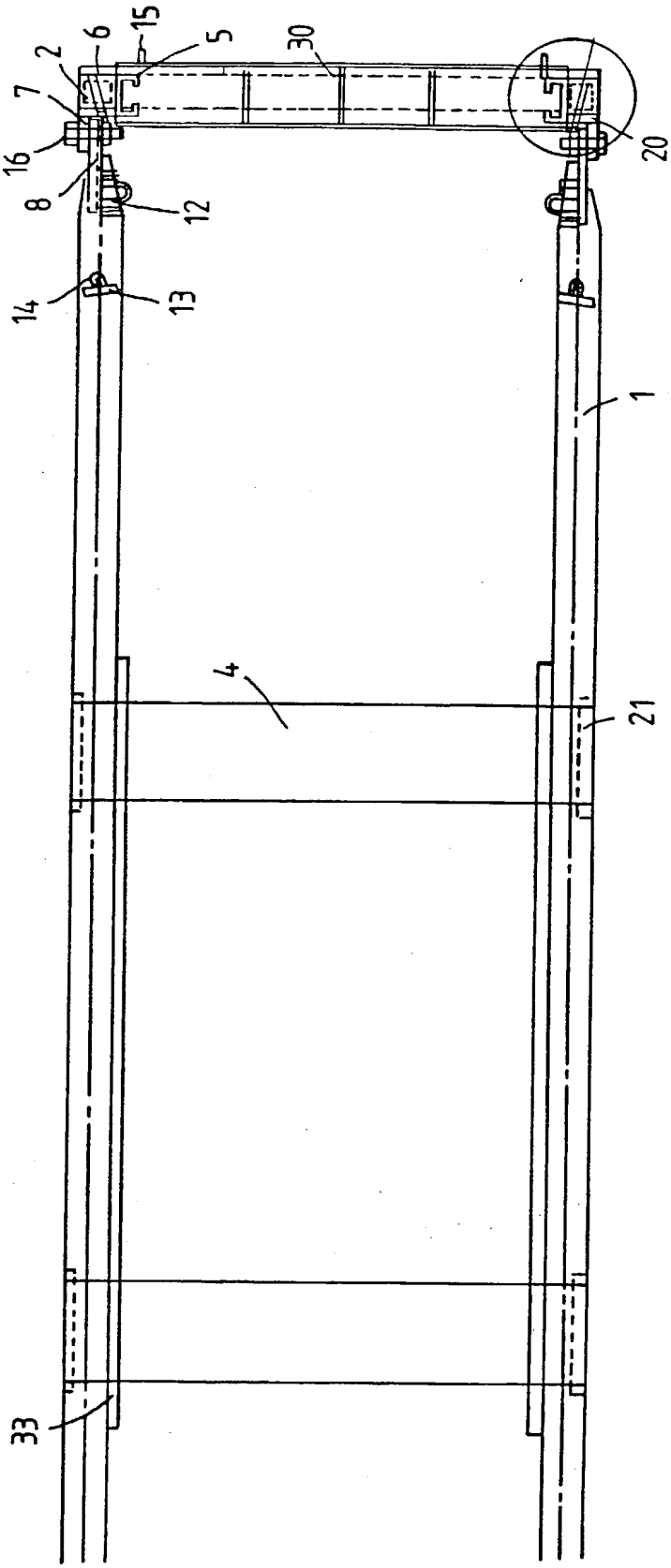


Fig. 2

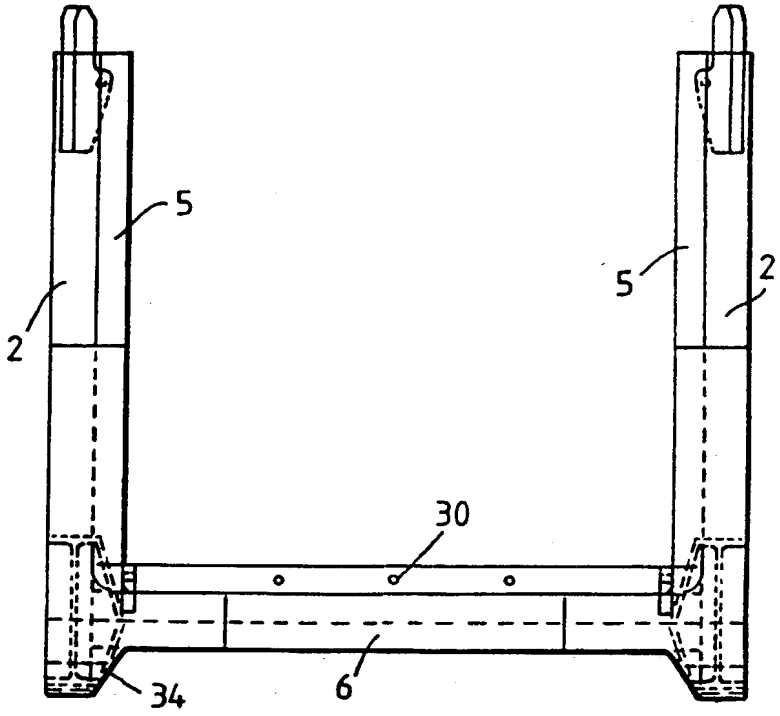


Fig. 3

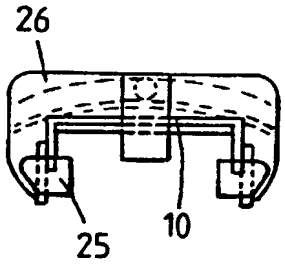


Fig. 4(a)

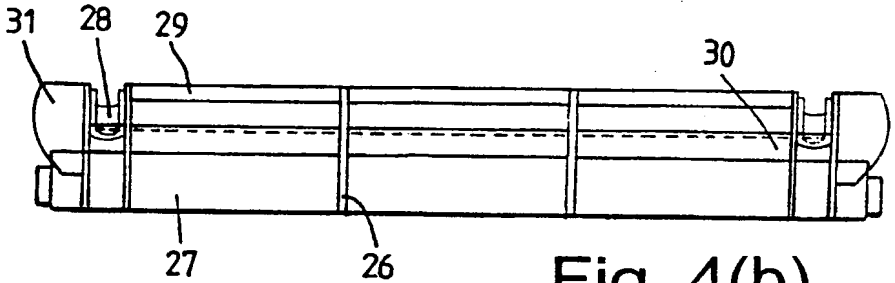


Fig. 4(b)

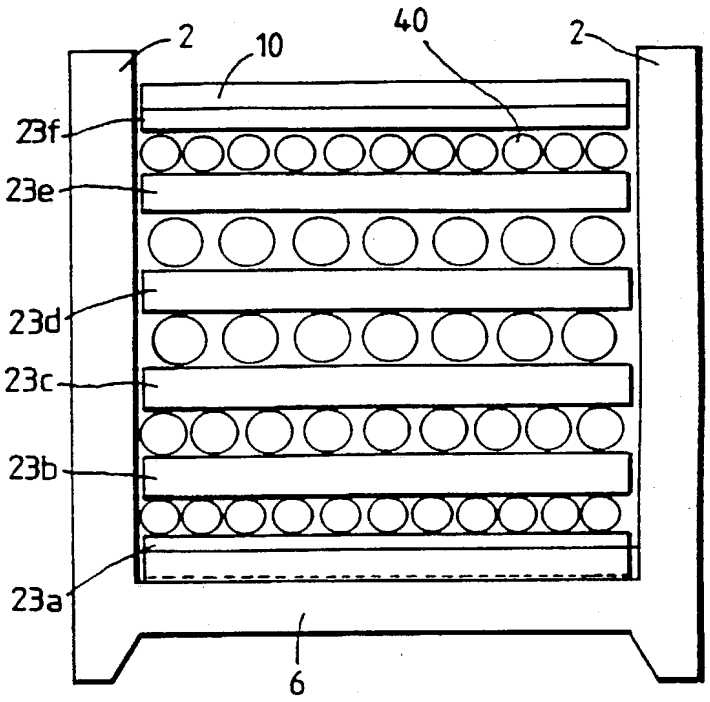


Fig. 5

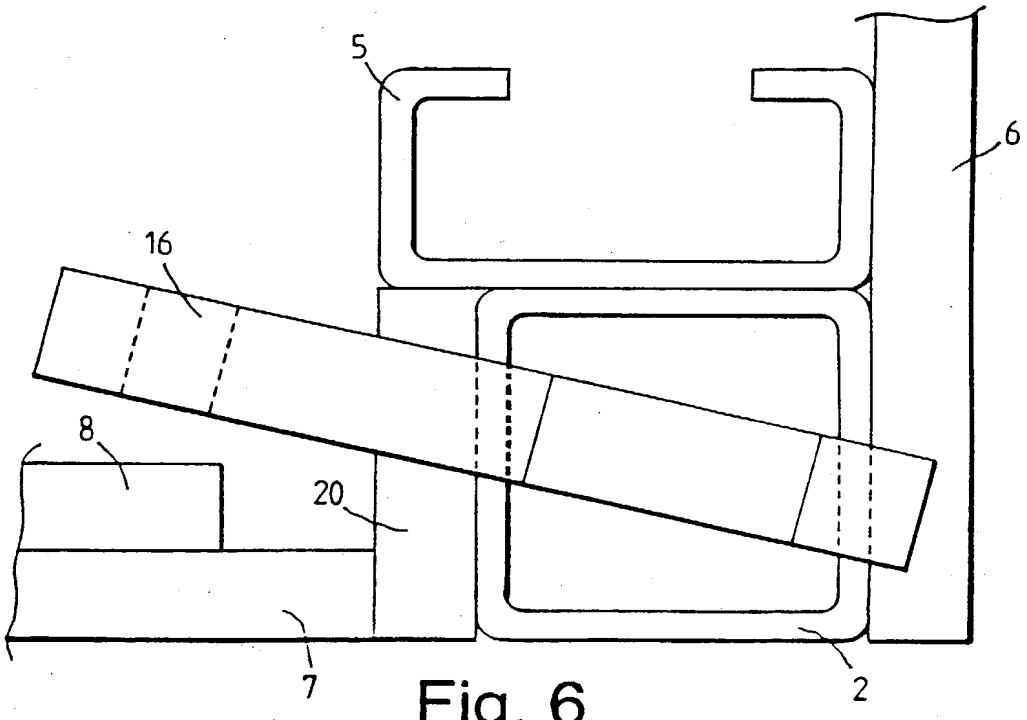


Fig. 6

Fig. 7

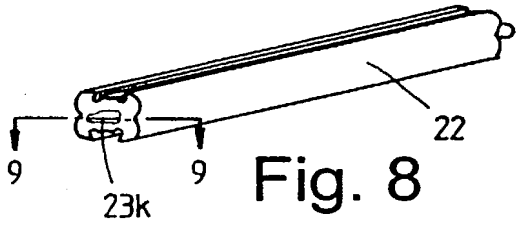
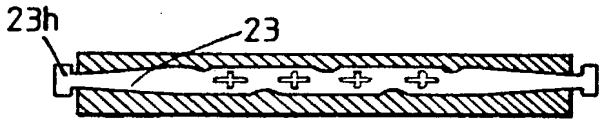


Fig. 8



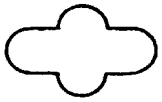


Fig. 9

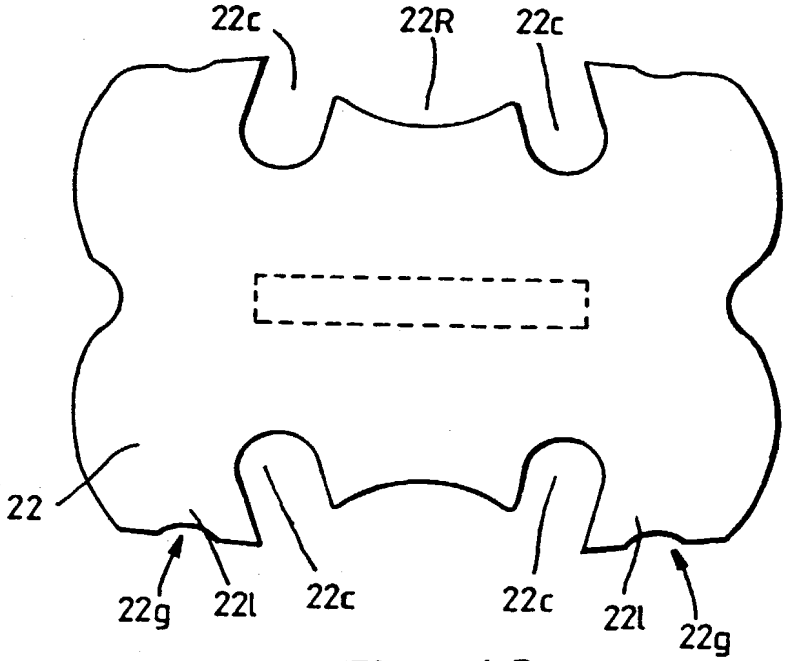


Fig. 10

ATTORNEY DOCKET NO. CAF-28502/03

DECLARATION, POWER OF ATTORNEY AND PETITION

As the below named inventor, I hereby declare:

my residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled _____ CARGO HANDLING APPARATUS _____, the specification of which

[ ] is attached hereto.

[X] was filed on July 23, 2001,
as Application Serial No. 09/889,834
and was amended on _____(if applicable).

[X] was described and claimed in PCT International Application No.PCT/GB00/00176
and as amended under PCT Article 19 on _____(if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent & Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

PRIORITY CLAIM UNDER 35 USC § 119(a)-(d)

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) or §365(b) of any foreign applications(s) for patent or inventor's certificate, or §365(a) of any PCT International Applications designating at least one country other than the U.S. listed below and have also identified below any foreign application for patent or inventor's certificate or of any PCT International Applications designating at least one country other than the U.S. having a filing date before that of the application on which priority is claimed:

[ ] no such applications have been filed

[X] application(s) listed below:

PRIOR FOREIGN APPLICATIONS(S)
Filed Within Twelve Months (Six Months For Design) Of This Application

			PRIORITY CLAIMED YES	NO
9901474.8	UNITED KINGDOM	23 JANUARY 1999	[X]	[ ]
(Number)	(Country)	(Day/month/year filed)		
			[ ]	[ ]
(Number)	(Country)	(Day/month/year filed)		
			[ ]	[ ]
(Number)	(Country)	(Day/month/year filed)		

CLAIM FOR BENEFIT OF PROVISIONAL APPLICATION UNDER 35 USC §119(e)

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States Provisional application listed below:

PROVISIONAL APPLICATION NO.	FILING DATE

CLAIM FOR BENEFIT OF EARLIER APPLICATIONS UNDER 35 USC §120

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s), or §365(c) of any PCT International Application(s) designating the U.S. listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose to the U.S. Patent & Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(App. Serial No.)	(Filing date)	(Status) (patented, pending, abandoned)
(App. Serial No.)	(Filing date)	(Status) (patented, pending, abandoned)

PRIOR FOREIGN APPLICATIONS
(Filed More Than Twelve Months (Six Months for Design) Prior To This Application

(Number)	(Country)	(Day/month/year filed)
(Number)	(Country)	(Day/month/year filed)
(Number)	(Country)	(Day/month/year filed)

POWER OF ATTORNEY

And I hereby appoint Ernest I. Gifford, P.O. Reg. 20,644; Allen M. Krass, P.O. Reg. No. 18,277; Irvin L. Groh, P.O. Reg. No. 17,505; Douglas W. Sprinkle, P.O. Reg. No. 27,394; Thomas E. Anderson, P.O. Reg. No. 31,318; Ronald W. Citkowski, P.O. Reg. No. 31,005; Judith M. Riley, P.O. Reg. No. 31,561; Douglas J. McEvoy, P.O. Reg. No. 34,385; Ellen S. Cogen, P.O. Reg. No. 38,109; Roberta J. Morris, P.O. Reg. No. 33,196; John G. Posa, P.O. Reg. No. 37,424; Douglas L. Wathen, P.O. Reg. No. 41,369; Avery N. Goldstein, P.O. Reg. No. 39,204; Mark D. Schneider, P.O. Reg. No. 43,906; and Beverly M. Bunting, P.O. Reg. No. 36,072, as my attorneys, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith. Send all correspondence to: Judith M. Riley, 280 N. Old Woodward Avenue, Suite 400, Birmingham, Michigan 48009; Telephone (248) 647-6000.

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor Ralph Barclay ROSS

Inventor's signature

Date 27/10/01 Citizenship UK

Residence Aberdeen, Scotland, United Kingdom

Post Office Address : Pitmedden Road, Dyce, Aberdeen, AB21 0HB, United Kingdom

Full name of second, joint inventor, if any Michael Wayne CRABTREE

Inventor's signature

Date ____________ Citizenship ____________

Residence ____________

Post Office Address ____________